EPA/ROD/R01-96/128
1996

EPA Superfund
Record of Decision:

MATERIALS TECHNOLOGY LABORATORY (USARMY)
EPA ID: MA0213820939
OU 03
WATERTOWN, MA
06/28/1996

RECORD OF DECISION
AREA I
ARMY MATERIALS TECHNOLOGY LABORATORY
WATERTOWN, MASSACHUSETTS

IN ACCORDANCE WITH U.S. ARMY REGULATION 200-2, THIS DOCUMENT IS INTENDED BY THE U.S. ARMY TO COMPLY WITH THE NATIONAL ENVIRONMENTAL POLICY ACT OF 1969.

JUNE 28, 1996

TABLE OF CONTENTS

I. DECLARATION FOR THE RECORD OF DECISION

SITE NAME AND LOCATION

Area I
Army Materials Research Laboratory
Watertown, Massachusetts

STATEMENT OF PURPOSE AND BASIS

This decision document presents the U.S. Army's selected remedial action for Area I, Army Research Laboratory - Watertown (formally Army Materials Technology Laboratory; AMTL), Watertown, Massachusetts. It was developed in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) as amended, 42 USC §9601 et seq. and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR Part 300, to the extent practicable. The AMTL Base Realignment and Closure Environmental Coordinator; the Director, Army Research Laboratory; and the Director of the Office of Site Remediation and Restoration, U.S. Environmental Protection Agency Region I have been delegated the authority to approve this Record of Decision.

This decision is based on the Administrative Record that has been developed in accordance with Section 113(k) of CERCLA. The Administrative Record is available for public review at the AMTL BRAC Office, Building 131, Army Research Laboratory, Watertown, Massachusetts, and at the Main Branch of the Watertown Public Library, Watertown, Massachusetts. The Administrative Record Index (Appendix D of this Record of Decision) identifies each of the items considered during the selection of the remedial action.

ASSESSMENT OF THE SITE

Actual or potential releases of hazardous substances from an area of soil adjacent to Area I, if not addressed by implementing the response action selected in this Record of Decision, may present an imminent and substantial endangerment to the public health, welfare, or the environment.

DESCRIPTION OF THE SELECTED REMEDY

This remedial action addresses long-term residential and commercial exposure to contaminated soil, the principal known threat at Area I. It consists of excavating the contaminated soil and shipping it to an approved landfill or soil recycling operation in accordance with applicable Massachusetts requirements at 310 CMR 19, Solid Waste Management. Following sampling to ensure that cleanup levels have been met, the excavation will be backfilled with clean soil and the topography restored. The remedy removes the source of the contamination and reduces the potential risk to residents or workers at Building 131. The remedy is consistent with the overall remedial strategy for AMTL.

STATE CONCURRENCE

The Commonwealth of Massachusetts has concurred with the selected remedy. Appendix C of this Record of Decision contains a copy of the declaration of concurrence.

DECLARATION

The selected remedy is consistent with CERCLA, and to the extent practicable, the NCP, is protective of human health and the environment, complies with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost effective. The remedy utilizes a permanent solution at Area I. However, because treatment was not found to be practicable for this action, this remedy does not satisfy the statutory preference for treatment as a principal element. This remedy will not result in hazardous substances remaining within Area I above cleanup levels.

The foregoing represents the selection of a remedial action by the U.S. Department of the Army and the U.S. Environmental Protection Agency, with the concurrence of the Commonwealth of Massachusetts Department of Environmental Protection.

Concur and recommend for immediate implementation:

ROBERT E. CHASE
BRAC Environmental Coordinator

The foregoing represents the selection of a remedial action by the U.S. Department of the Army and the U.S. Environmental Protection Agency, with the concurrence of the Commonwealth of Massachusetts Department of Environmental Protection.

Concur and recommend for immediate implementation:

JOHN W. LYONS
Director
Army Research Laboratory

The foregoing represents the selection of a remedial action by the U.S. Department of the Army and the U.S. Environmental Protection Agency, with the concurrence of the Commonwealth of Massachusetts Department of Environmental Protection.

Concur and recommend for immediate implementation:

LINDA M. MURPHY
Director, Office of Site Remediation and Restoration
U.S. Environmental Protection, Region I

II. DECISION SUMMARY

A. SITE NAME, LOCATION AND DESCRIPTION

Operations at the Army Materials Technology Laboratory (AMTL), Watertown, Massachusetts began in 1816 as the Watertown Arsenal. It was established for the purposes of storage, repair, cleaning, and issue of small arms and ordnance supplies. Throughout the 1800's and until World War II, AMTL's mission was continually expanded to include weapons development and production, and materials research, experimentation, and

In the 1920's an easement on approximately 11 acres was granted to the Metropolitan District Commission to construct North Beacon Street and the river park. An operational phase out of the arsenal was begun in 1967. At that time, approximately 55 acres of land were sold to the town of Watertown, and 28.5 acres were transferred to the General Services Administration. The remaining 37 acres became AMTL. In December, 1988, AMTL was included on the Base Realignment and Closure (BRAC) list. A more complete description of the facility can be found in the Remedial Investigation Report at pages 1-2 to 1-10. A facility map is provided at Figure 1.

Area I is located adjacent to Building 131. This building is a three-story brick building with basement, located on the eastern boundary of the facility. Since it was built in 1900, the building has undergone several renovations and additions and currently contains approximately 46,000 ft2 of floor space.

Area I is estimated to be approximately 110' by 80' (900 cubic yards of soil).

B. SITE HISTORY AND ENFORCEMENT ACTIVITIES

1. Land Use and Response History

Since its construction, Building 131 has been used for administration. The building also contained a health clinic, photo shop, and print shop. An area (Area I, Figure 2) outside of the building adjacent to Kingsbury Avenue, was found to have polynuclear aromatic hydrocarbon (PAH) and pesticide concentrations above background. A more detailed description of the facility's history can be found in the Remedial Investigation Report at page 1-6 and the Feasibility Study at pages 3-1 to 3-1 to 3-7.

2. Enforcement History

Previous investigations that pertain to environmental conditions at AMTL were completed between September 1968 and December 1987. AMTL was first listed by the Massachusetts Department of Environmental Protection (MADEP) as a Location To Be Investigated on January 15, 1987. A Preliminary Assessment/Site Inspection was completed in 1988. A Phase I Remedial Investigation (RI) was completed in April 1991. AMTL was subsequently confirmed as a Disposal Site by MADEP on January 15, 1992. A Phase II RI was completed in December 1993.

In July 1993, the facility was proposed for inclusion on the National Priorities List (NPL). It was added to the NPL on May 30, 1994. A Federal Facilities Agreement was developed and signed by the Army and USEPA Region I on July 24, 1995.

A Feasibility Study for Outdoor Areas was completed in January 1996. The proposed plan detailing the Army's preferred remedial alternative was issued in April 1996. As part of the proposed plan, accelerated remediation of the contaminated soil at Area I was proposed to allow transfer of Building 131. As a result of this decision, Area I has been segregated from the other areas addressed under the FS and is being addressed in this ROD.

A Technical Memorandum dated June 28, 1996 has been developed by the Army to supplement the FS and provide the basis for this accelerated remedial action.

C. COMMUNITY PARTICIPATION

Throughout the Site's history, community concern and involvement has been high. The Army has kept the community concerns and keep citizens informed about and involved in activities during meeting, fact sheets, press releases and public meetings.

In February 1992, the Army revised a community relations plan which outlined a program to address community concerns and keep citizens informed about and involved in activities during remedial activities. This plan was updated in May 1995.

A Restoration Advisory Board (RAB) was established January 1994 in accordance with the President's Five Point Initiative. The RAB has allowed the community easy access to the base closure/remediation process, kept the community informed and given them the opportunity to make recommendations which effect the community. Since its inception there have been monthly meetings.

On June 24, 1996, the Army made the administrative record available for public review. The record will be maintained at AMTL, and at the Main Branch of the Watertown Public Library. A copy of the Administrative Record Index is on file at the EPA's offices in Boston. The Army published a notice and brief analysis of the Proposed Plan in the Watertown Sun on May 1 and May 8, 1996, and the Watertown Library. On April 16, 1996, the Army held an informational meeting the public at the Watertown Library. On April 16, 1996, the Army held an informational meeting to discuss the results of the Remedial Investigation and the cleanup alternatives presented in the Feasibility Study and to present the Agency's Proposed Plan. Also during this meeting, the Army answered questions from the public. From April 22 to May 21, 1996, the Army held a 30-day public comment period to accept public comment on the alternatives presented in the Feasibility Study and the Proposed Plan and on any other documents previously released to the public. On May 13, 1996 the Army held a public hearing to discuss the Proposed Plan and to accept any oral comments. No comments were received on the limited Area I action outlined in this ROD.

D. SCOPE AND ROLE OF OPERABLE UNIT OR RESPONSE ACTION

The selected remedy removes the source of contamination at Area I. It is consistent with the proposed action for the soils at other areas of the facility.

This remedial action will address the principal threat to human health and the environment to future residents or visitors posed by long-term exposure to contaminated soils at the site.

E. SUMMARY OF SITE CHARACTERISTICS

Chapter 1 of the Feasibility Study contains an overview of the Remedial Investigation. The significant findings of the Remedial Investigation for Area I are summarized below. A complete discussion of site characteristics can be found in the Remedial Investigation Report at Pages 4-1 to 4-35.

1. Soil

Elevated levels of PAHs and pesticides were found in one soil boring taken between Buildings 37 and 131 (Area I). The maximum concentrations are provided in Table 1. The estimated amount of soil to be removed from Area I is 900 cubic yards.

There are two primary pathways for migration of soil contamination to other media. The first involves erosion and runoff to storm sewers and the Charles River. The Charles River is a separate operable unit currently in the RI phase.

The second pathway is leaching to groundwater. Many of the contaminants detected in soil at the facility have also been detected in the groundwater. Soils at AMTL consist primarily of sands and fill, which do not effectively immobilize contaminants.

2. Groundwater

Building 131 was included in the central area monitoring wells sampled during the RI. Groundwater flows from the north towards the Charles River. The wells included 7 shallow (15 to 20 feet below ground surface) and 2 deep (20 to 25 feet) wells. Chlorinated solvents (tetrachloroethylene (PCE) and trichloroethylene (TCE) were found in the wells. These solvents were also found in upgradient wells located off of the facility. One well located in the parking lot behind Building 131 had elevated levels of 1,3-dimethylbenzene and xylene. These were not found in nearby wells, suggesting a restricted fuel release.

The groundwater is not currently used, nor is likely to be used, in the future as a drinking water source. It does meet the commonwealth of Massachusetts standards for a non-drinking water source (GW-3). Groundwater does discharge from the facility into the Charles River. A model of contaminant contribution developed in the FS showed that the potential discharge of contaminants from the groundwater to the Charles River did not exceed Water Quality Criteria. Based on the lack of receptors, groundwater remediation is not required and is not addressed in this ROD.

F. SUMMARY OF SITE RISKS

A Baseline Risk Assessment (Section 6 of the RI report) was performed to estimate the probability and magnitude of potential averse human health and environmental effects from exposure to contaminants associated with the facility. The facility was segregated into 5 zones based on the Town's approved Reuse Plan (Figure 1). Zones 1 and 2 are proposed for commercial reuse, zone 4 and River Park are proposed open space, and Zone 3 is to be used for residential purpose. Area I is found in zone 3.

The human health risk assessment followed a four step process: 1) Contaminant identification, which identified those hazardous substances which, given the specifics of the site were of significant concern; 2) Exposure assessment, which identified actual or potential exposure pathways, characterized the potentially exposed populations, and determined the extent of possible exposure; 3) Toxicity assessment, which considered the types and magnitude of adverse health effects associated with exposure to hazardous substances, and 4) Risk characterization, which integrated the three earlier steps to summarize the potential and actual risks. The results of hazardous substances at the site, including carcinogenic and non-carcinogenic risks. The results of the human health risk assessment for AMTL are discussed below.

Fifteen contaminants of concern, listed in Table 2 found in Appendix B of this Record of Decision were selected for evaluation in the risk assessment. These contaminants constitute a representative subset of the more than 40 contaminants sampled for at the facility during the Remedial Investigation. The 15 contaminants of concern were selected to represent potential site related hazards based on toxicity, concentration, frequency of detection, and mobility and persistence in the environment. A summary of the health effects of each of the contaminants of concern can be found in Appendix R of the RI report.

Potential human health effects associated with exposure to the contaminants of concern were estimated quantitatively or qualitatively through the development of several hypothetical exposure pathways. These pathways were developed to reflect the potential for exposure to hazardous substances based on commercial use, the proposed future residential reuse of zone 3 (including Building 131) and the open space use for Zone 4 and the River Park. The following is a brief summary of the exposure pathways evaluated. A more thorough description can be found in Section 6 of the RI report. As discussed earlier, the groundwater meets the MADEP GW-3 standards and is not likely to be used as a source of drinking water. Therefore, it was not evaluated in the risk assessment. For commercial office workers, the only pathway evaluated was the incidental ingestion of surface soil for 250 days per year for 25 years.

For residents, both ingestion and dermal contact were evaluated for 153 days per year over 30 years. The resident was also assumed to visit the open space zone (56 days per year), swim in the Charles River (7 times per year), and eat fish from the river 10 times per year. Children were assumed to have the same exposure frequency, but the exposure time was shortened to reflect the age ranges (1-8, and 7-17). For each pathway evaluated, a Reasonable Maximum Exposure (RME) estimate was generated corresponding to exposure to the average and the maximum concentration detected in that particular medium.

Excess lifetime cancer risks were determined for each exposure pathway by multiplying the exposure level with the chemical specific cancer slope factor. Cancer slope factors have been developed by EPA from epidemiological or animal studies to reflect a conservative "upper bound" of the risk posed by potentially carcinogenic compounds. That is, the true risk is unlikely to be greater than the risk predicted. The resulting risk estimates are expressed in scientific notation as a Probability (e.g. 1 x 10-6 for 1/1,000,000), that assuming an RME, an average individual is not likely to have greater than a one-in-a-million chance of developing cancer over 70 years as a result of site-related exposure, and the risk may be as low as zero. Current EPA practice considers carcinogenic risks to be additive when assessing exposure to a mixture of hazardous substances.

The hazard index was also calculated for each pathway as EPA's measure of the potential for non-carcinogenic health effects. A hazard quotient is calculated by dividing the exposure level by the reference dose (RfD) or other suitable benchmark for non-carcinogenic health effects for an individual compound. Reference doses have been developed by EPA to protect sensitive individuals over the course of a lifetime and they reflect a daily exposure level that is likely to be without an appreciable risk of an adverse health effect. RfDs are derived from epidemiological or animal studies and incorporate uncertainty factors to help ensure that adverse health effects will not occur. The hazard quotient is often expressed as a single value (e.g. 0.3) indicating the ratio of the estimated exposure to the reference dose value (in this example, the exposure as characterized is approximately one third of an acceptable exposure level for the given compound). The hazard quotient is only considered additive for compounds that have the same or similar toxic endpoint and the sum is referred to as the hazard index (HI, For example: the hazard quotient for a compound known to produce liver damage should not be added to a second whose toxic endpoint is kidney damage).

Tables 3 and 4 presents the carcinogenic and non-carcinogenic risk summary for the contaminants of concern in soil evaluated to reflect present and potential future residential reuse corresponding to the RME scenarios. The detailed risk calculations can be found in appendix P of the RI report and the Human Health Risk Assessment Addendum (child trespasser).

The potential risks fall at the upper limit of the acceptable range of 10-4 to 10-6. The risks to commercial workers (present use scenario) was driven by 6 PAHs. Under the residential reuse scenario, 7 PAH's, 6 pesticides and PCBs contributed to the overall risk.

The ecological risk was evaluated only in Zone 4 and River Park because these areas were considered the only potential ecological habitats at the site. The results of the ecological risk assessment found that the pesticides DDT, DDE, chlordane, and endrin pose a risk to ecological receptors. Certain metals (arsenic, chromium, lead, nickel, and zinc) also pose a risk to ecological receptors. However, none of the above compounds were found to exceed cleanup goals (or background in the case of the metals) so the cleanup is driven by the risk to human health. More information can be found in Section 6 of the RI and in the Terrestrial Ecological Risk Assessment Report.

The arithmetic concentrations at the facility are less than the cleanup goals. The cleanup goals were set at the 90th Upper Confidence Limit (UCL) on the arithmetic mean of the background sampling data. However, there are several small areas which have concentrations above the goals. Area I adjacent to Building 131 has been identified as exceeding these cleanup goals. The hazardous substances at this area, if not addressed by implementing the response action selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment.

G. DEVELOPMENT AND SCREENING OF ALTERNATIVES

1. Statutory Requirements/Response Objectives

Under its legal authorities, the Army's primary responsibility at Superfund sites is to undertake remedial actions that are protective of human health and the environment. In addition, Section 121 of CERCLA establishes several other statutory requirements and preferences, including: a requirement that the Army's remedial action, when complete, must comply with all federal and more stringent state environmental standards, requirements, criteria or limitations, unless a waiver is invoked; a requirement that the Army select a remedial action that is cost-effective and that utilizes permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable; and a preference for remedies in which treatment which permanently and significantly reduces the volume, toxicity or mobility of the hazardous substances is a principal element over remedies not involving such treatment. Response alternatives were developed to be consistent with these Congressional mandates.

2. Technology and Alternative Development and Screening

CERCLA and the NCP set forth the process by which remedial actions are evaluated and selected. In accordance with these requirements, a range of alternatives were developed for the facility.

As discussed in Section 3 of the Feasibility Study, the RI/FS identified, assessed and screened technologies based on implementability, effectiveness, and cost. These technologies were combined into source control (SC) and management of migration (MM) alternatives. Section 4 of the Feasibility Study presented the remedial alternatives developed by combining the technologies identified in the previous screening process in the categories identified in Section 300.430(e)(3) of the NCP. The purpose of the initial screening was to narrow the number of potential remedial actions for further detailed analysis while preserving a range of options. Each alternative was then evaluated and screened in Section 5 of the Feasibility Study.

In summary, of the six soil remedial alternatives screened in Section 4 of the FS, all six were retained for detailed analysis. Table 5 identifies the alternatives that were retained through the screening process.

H. DESCRIPTION OF ALTERNATIVES

Table 5 provides a narrative summary of each alternative evaluated. This is an accelerated action separate from the remainder of the remedial action. Because this action has to occur prior to the completion of the chemical oxidation treatability studies, and due to higher mobilization costs for the limited amount of soft, the contingency alternative of off-site disposal was selected for the accelerated action. The cost for this action was based on the reduced volume of soil and the assumptions made for the contingency alternative detailed in the FS.

I. SUMMARY OF THE COMPARATIVE ANALYSIS OF ALTERNATIVES

Section 121(b)(1) of CERCLA presents several factors that at a minimum EPA is required to consider in its assessment of alternatives. Building upon these specific statutory mandates, Section 300.430(e)(9)(iii) of the NCP articulates nine evaluation criteria to be used in assessing the individual remedial alternatives. A detailed analysis was performed on the alternatives using the nine evaluation criteria in order to select a site remedy. These criteria are summarized as follows:

Threshold Criteria

The two threshold criteria described below must be met in order for the alternatives to be eligible for selection in accordance with the NCP.

1. Overall protection of human health and the environment addresses whether or not a remedy provides adequate protection from unacceptable risks posed through each pathway by eliminating, reducing, or controlling exposures through treatment, engineering controls, or institutional controls.

2. Compliance with applicable or relevant and appropriate requirements (ARARS) addresses whether or not a remedy will meet all of the ARARs of other Federal and State environmental and facility siting laws or provide grounds for invoking a waiver.

Primary Balancing Criteria

The following five criteria are utilized to compare and evaluate the elements of one alternative to another that meet the threshold criteria.

3. Long-term effectiveness and permanence addresses the criteria that are utilized to assess alternatives for the long-term effectiveness and permanence afford, along with the degree of certainty that they will prove successful.

4. Reduction of toxicity, mobility, or volume through treatment addresses the degree to which alternatives employ recycling or treatment that reduces toxicity, mobility, or volume, including how treatment is used to address the principal threats posed by the site.

5. Short term effectiveness addresses the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be pose during the construction and implementation period, until cleanup goals are achieved.

6. Implementability addresses the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement a particular option.

7. Cost includes estimated capital and Operation Maintenance (O&M) costs, as well as present-worth costs.

Modifying Criteria

The modifying criteria are used on the final evaluation of remedial alternatives generally after the Army has received public comment on the RI/FS and Proposed Plan.

8. State acceptance addresses the State's position and key concerns related to the preferred alternative and other alternatives, and the State's comments on ARARs or the proposed use of waivers.

9. Community acceptance addresses the public's general response to the alternatives described in the Proposed Plan and RI/FS report.

A non-cost comparison of each alternative according to the criteria can be found in Table 6.

J. THE SELECTED REMEDY

Because of the small size of the project (approximately 900 cy of soil), only the Alternative S6 (excavation) would be practicable based on startup costs and time to implement. This involves the excavation of the soil, transport to an approved off-site landfill or recycling facility; confirmatory sampling to ensure that cleanup levels have been attained; and backfilling of the excavation with clean fill. The estimated costs for this alternative are presented in Table 8.

1. Soil Cleanup Levels

Cleanup levels for known and suspected carcinogens (Classes A, B, and C compounds) have been set at a 1x 10-6 excess cancer risk level considering exposures via dermal contact and incidental ingestion. Exposure parameters have been described in Section 6 of the RI. If a cleanup value described above is not capable of being detected with good precision and accuracy or is below background values, then the background value was used as appropriate for the soil cleanup level. With the exception of DDD the cleanup levels were set at background. Table 1 summarizes the cleanup levels for the contaminants of concern in soils for Area I. The cleanup goals for Area I are based on the assumption of future residential use.

These cleanup levels must be met at the completion of the remedial action at the points of compliance which is soils at depths less then 15 feet. These cleanup levels attain EPA's risk management goal for remedial actions and have been determined by EPA to be protective of human health and the environment.

2. Description of Remedial Components

The contaminated soil will be excavated by backhoe and placed in lined trucks for transport to an offsite disposal facility. Confirmation testing will occur during the excavation to ensure that the cleanup goals are met.

Because of the small volume of soil to be excavated under this remedial action, on-site treatment is not viable nor cost effective. Therefore, the contaminated soil will be sent off-site for disposal. As part of the remedial action, excavated soils will undergo TCLP testing to determine whether they constitute characteristic RCRA hazardous waste. Non-hazardous soils shall be shipped to an asphalt batching facility or other non-hazardous waste landfill. Soils which fail the TCLP test will be sent to a licensed RCRA Treatment, Storage, and Disposal Facility (TSDF).

Estimated Time for Design and Construction:	1 month
Estimated Period for Operation:	1 month
Estimated Capital Cost:	$523 300
Estimated Operation and Maintenance Cost (net present worth):	$0
Estimated Total Cost (30-year net present worth):	$523,300

K. STATUTORY DETERMINATIONS

The remedial action selected for implementation at Area I of the Army Materials Technology Laboratory is consistent with CERCLA and, to the extent practicable, the NCP. The selected remedy is protective of human health and the environment, attains ARARs and is cost effective.

1. Selected Remedy is Protective of Human Health and the Environment

The remedy at Area I will permanently reduce the risks posed to human health and the environment by eliminating exposures to human and environmental receptors by removing the source of the contamination and disposing of the soils off-site.

Moreover, the selected remedy will achieve potential human health risk levels that attain the 10-4 to 10-6 incremental cancer risk range and a level protective of noncarcinogenic endpoints. No unacceptable short-term risks or cross-media impacts will be caused by the implementation of the selected remedy.

2. Selected Remedy Attains ARARs

This remedy will attain all applicable or relevant and appropriate federal and state requirements that apply to on-site remedial activities. ARARS for the selected remedial action and the actions to be taken to attain them are summarized below and in Table 7.

- Resource Conservation and Recovery Act
- Clean Air Act
- National Historic Preservation Act
- Archaeological and Historic Preservation Act
- Massachusetts Hazardous Waste Management
- Massachusetts Solid Waste Management
- Massachusetts Air Pollution Control
- Massachusetts Historical Commission Regulations

In addition, it should be noted that while the requirements governing transportation and disposal of hazardous waste are not ARARs since they apply to off-site activities, the Army will determined to be ensure that the transportation and disposal of any excavated soils which are determined to be hazardous waste will be conducted in accordance with all applicable Federal and State laws and regulations.

3. Selected Remedial Action is Cost-Effective

In the Army's judgment, the selected remedy is cost effective, i.e., the remedy affords overall effectiveness proportional to its costs. In selecting this remedy, the Army identified alternatives that are protective of human health and the environment. The Army evaluated the overall effectiveness of each alternative by assessing the relevant three criteria-long term effectiveness and permanence; reduction in toxicity, mobility, and volume through treatment; and short term effectiveness, in combination. The relationship of the overall effectiveness of this remedial alternative was determined to be proportional to its costs. The costs of this remedial alternative are $523,000 with no Operation and Maintenance costs.

4. Selected Remedy Utilizes Permanent Solutions and Alternative Treatment or Resource Recovery Technologies to the Maximum Extent Practicable

Once the Army identified those alternatives that attain or, as appropriate, waive ARARs and that are protective of human health and the environment, the Army identified which alternative utilizes permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. This determination was made by deciding which one of the identified alternatives provides the best balance of trade-offs among alternatives in terms of: 1) Long-term effectiveness and permanence; 2) Reduction of toxicity, mobility or volume through treatment; 3) Short-term effectiveness; 4)Implementability; and 5) Cost. The balancing test emphasized long-term effectiveness and permanence and the reduction of toxicity, mobility and volume through treatment; and considered the preference for treatment as a principal element, the bias against off-site land disposal of untreated waste, and community and state acceptance. The selected remedy achieves a high level of long-term effectiveness and permanence, has few short-term impacts and is easily implementable. The Community and State have accepted the selected remedy. The removal of the contaminated soil with off-site disposal was determined to be an effective mechanism of eliminating exposure to unacceptable risk and responding to the community's request for expedited removal to allow for transfer of the property.

5. Selected Remedy does not Satisfy the Preference for Treatment Which Permanently and Significantly reduces the Toxicity, Mobility or Volume of the Hazardous Substances as a Principal Element.

The principal element of the selected remedy is the removal of contaminated soil. This element addresses the primary threat at the Site, contamination of surface soil. Because the selected remedy addresses a small volume of contaminated soil, on-site treatment was not found to be cost effective. Of the offsite options only recycling (asphalt batching) and landfill disposal were cost effective. The final disposal option will be determined following waste characterization testing during construction.

L. DOCUMENTATION OF SIGNIFICANT CHANGES

The Army presented a proposed plan (preferred alternative) for remediation the Site on April 16, 1996. The Proposed Plan included a section which recommended an accelerated remedial action for Areas I and M. The preferred alternative for Areas I and M was excavation and offsite disposal of contaminated soils.

This ROD does not include Area M in the remedial action. Area M will be included in the final ROD for the remainder of the site, scheduled to be signed in September 1996.

M. STATE ROLE

The Commonwealth of Massachusetts Department of Environmental Protection has reviewed the various alternatives and has indicated its support for the selected remedy. The Commonwealth has also reviewed the Remedial Investigation, Risk Assessment and Feasibility Study to determine if the selected remedy is in compliance with State ARARs. The Commonwealth of Massachusetts concurs with the selected remedy for Area I at the Army Materials Technology Laboratory. A copy of the declaration of concurrence is attached as Appendix C.

Appendix A. Figures

Figure 1. Map of Facility

Figure 2. Building 131

Appendix B. Tables

Table 1. Summary of Contaminants Of Concern and Cleanup Levels Area I

Contaminant	Concentration (ug/g)	Soil Cleanup Goal	Basis	Residual Carcinogenic Risk to Human Health
benzo(a)anthracene	7.69	8.5	Background	2.6 x 10-5
benzo(a)pyrene	8.23	2.0	Background	5.9 x 10-6
benzo(b)fluoranthene	8.13	7.9	Background	2.4 x 10-5
indeno[1,2,3-cd]pyrene	11.1	3.0	Background	9.4 x 10.6
dibenz[a,h]anthracene	0.82	0.27	Background	8.1 x 10-7
chlordane	2.7	1.5	Background	8.2 x 10-7
DDD	0.38	0.25	Risk	2.5 x 10-8
DDE	0.58	0.39	Background	5.4 x 10-8
DDT	1.2	0.6	Background	8.4 x 10-8
dieldrin	0.082	0.056	Background	3.8 x 10-7
Total Residual Carcinogenic Risk				4.1 x 10-5

ND- Not detected

Table 2. Chemicals of Potential Concern

Benzo(a)anthracene
Benzo(a)pyrene
Benzo(b)fluoranthene
Benzo(k)fluoranthene
Chlordane
Chrysene
DDD
DDE
DDT
Dibenz(a,h)anthracene
Dieldrin
Heptachlor epoxide
Ideno(1,2,3-cd)pyrene
Lead
Arochlor-1260

Table 3. Lifetime Risk

Area	Receptor	Medium	Route	Risk
Present Commercial Use				
	Commercial Worker	Soil	Ingestion	2 x 10-5
I				
	Child Trespasser	Soil	Ingestion	5 x 10-6
			Dermal	5 x 10-6
	Youth Trespasser	Soil	Ingestion	1 x 10-6
			Dermal	3 x 10-6
Total Site Risk				3 x 10-5
Future Residential Use				
Zone 3 (Area I)		Soil	Ingestion	5 x 10-5
			Dermal	6 x 10-6
Open Space		Soil	Ingestion	2 x 10-5
			Dermal	6 x 10-6
River Park (Area M)		Soil	Ingestion	1 x 10-5
			Dermal	1 x 10-6
Charles River		Surface Water	Ingestion	1 x 10-10
			Dermal	8 x 10-9
		Sediment	Ingestion	2 x 10-6
			Dermal	5 x 10-9
		Fish	Ingestion	5 x 10-8
Total Site Risk				1 x 10-4

Table 4. Hazard Index

Exposure Point	Exposure Medium	Exposure Route	Subchronic Hazard Index	Chronic Hazard Index
Present Commercial Use				
Commercial Worker	Soil	Ingestion	0.02	0.02
Child Trespasser	Soil	Ingestion		0.05
		Dermal		0.03
Youth Trespasser	Soil	Ingestion		0.01
		Dermal		0.01
Total Hazard Index			0.02	0.12
Future Residential (Child)				
Zone 3 (Area I)	Soil	Ingestion	0.1	0.01
		Dermal	0.02	0.06
Open Space	Soil	Ingestion	0.2	0.1
		Dermal	0.02	0.03
River Park (Area M)	Soil	Ingestion	0.03	0.02
		Dermal	0.004	0.004
Charles River	Surface Water	Ingestion	0.000004	0.00003
		Dermal	0.0001	0.001
	Sediment	Ingestion	0.001	0.002
		Dermal	0.0009	0.01
	Fish	Ingestion	0	0.01
Total Hazard Index			0.2	0.3

Table 5. Alternatives for Remediation of Soil

Alternative S1 - No Action

- No remedial actions implemented at the site.

Alternative S2 - Institutional Actions

- Access restrictions to prevent entry into contaminated areas.
- Deed restrictions to restrict site development.
- Five-year site reviews to assess conditions.

Alternative S3 - Capping of Soils

- Institutional controls.
- Five-year site reviews to assess conditions.
- Construction of asphalt cap over contaminated soils.
- Use of runon/runoff controls during cap placement.
- Continued monitoring of cap and repair of cap as necessary.

Alternative S4 - Soil Excavation and Thermal Treatment

- Excavation of soil contaminated at levels greater than action levels.
- Transportation of soil to:

  - Option A - On-site incinerator
  - Option B - Off-site incinerator
  - Option C - On-site low-temperature thermal desorber

- Backfilling of site with uncontaminated soil (Option B) or treated soil (Options A and C).

Alternative S5 - Soil Excavation and On-Site Physical/Chemical Treatment

- Excavation of soil contaminated at levels greater than action levels.
- On-site treatment of contaminated soil by:

  - Option A - Chemical oxidation
  - Option B - Solvent extraction

- Treatment or disposal of treatment residues.
- Backfilling of site with treated soil.

Alternative S6 - Soil Excavation and Off-Site Disposal or Reuse

- Excavation of soil contaminated at levels greater than action levels.
- Transportation of soil for off-site recycle or to hazardous or nonhazardous landfill.
- Backfilling of site with uncontaminated soil.

Table 6. Noncost Comparison of Soil Alternatives

Criteria	Alternative S1 No Action	Alternative S2 Institutional Controls	Alternative S3 Capping of Soils	Alternative S4 Option A Treatment Using On-Site Incineration	Alternative S4 Option B Treatment Using Off-Site Incineration	Alternative S4 Option C Treatment Using Thermal Desorption	Alternative S5 Option A Treatment Using Chemical Oxidation	Alternative S5 Option B Treatment Using Solvent Extraction	Alternative S6 Off-Site Disposal or Reuse
Overall-Protection of Human Health and the Environment									
Protectiveness	Would fall to achieve remedial action objectives for contaminated soils	Would fall to achieve remedial action objectives for contaminated soils	Would protect human health and the environment by preventing direct human contact with risk-based soils	Would protect human health and the environment by permanently destroying contaminants above background or risk-based levels	Would protect human health and the environment by permanently destroying contaminants above background or risk-based levels	Would protect human health and the environment by permanently removing contaminants from site soil	Would protect human health and the environment by permanently destroying contaminants in site soils	Would protect human health and the environment by extracting contaminants from soils	Would protect human health and the environment by removing contaminated soils from the site and disposing them in an approved landfill
Compliance with ARAR's									
Chemical-Specific	None	None	None	None	None	None	None	None	None
Location-Specific	Not applicable	Would meet location-specific ARARs	Would meet location-specific ARAR's	Would meet location-specific ARAR's	Would meet location-specific ARARs	Would meet location-specific ARARs	Would meet location-specific ARARs	Would meet location-specific ARARs	Would meet location-specific ARARs
Action-Specific	Not applicable	Not applicable	Would meet action-specific ARARs Stabilization may be required	Would meet action-specific ARARs Stabilization may be required	Would meet action-specific ARARs Stabilization may be required	Would meet action-specific ARARs	Would meet action-specific ARARs	Would meet action-specific ARAR's	Would meet action-specific ARARs Stabilization may be required
Compliance with Other Criteria Waiver Laws and Guidance	Does not meet remedial response objective criteria	Does not meet remedial response objective criteria	Meets remedial response objectives criteria	Meets remedial response objectives criteria	Meets remedial response objectives criteria	Meets remedial response objectives criteria	Meets remedial response objectives criteria	Meets remedial response objectives criteria	Meets remedial response objectives criteria
Adequacy and Reliability of Controls	Not applicable	Not adequate to meet remedial objectives for contaminated soils	Asphalt cap would require long-term maintenance commitment and institutional controls	Soil contaminants will destroyed by incineration, thereby eliminating the need for long term controls	Soil contaminants will be destroyed by incineration, thereby eliminating the need for long-term controls	Soil contaminants will be removed and treated separately, thereby eliminating the need for long-term controls	Soil contaminants will be destroyed by chemical oxidation, thereby eliminating the need for long-term controls	Soil contaminants will be extracted, thereby eliminating the need for long-term controls	Contaminated soils will be removed from the site; however, disposed soils will have to be managed in a landfill indefinitely
Magnitude of Residual Risk	Risk not reduced	No reduction in risk to environmental receptors	Residual risk minimized as long as cap is properly maintained	Risk reduced to background levels of contaminants (within NCP accepted levels)	Risk reduced to background levels of contaminants (within NCP accepted levels)	Risk reduced to background levels of contaminants (within NCP accepted levels)	Risk reduced to background levels of contaminants (within NCP acceptable levels)	Risk reduced to background levels of contaminants within NCP acceptable levels)	Risk reduced to background levels of contaminants (within NCP acceptable levels)

Criteria	Alternative S1 No Action	Alternative S2 Institutional Controls	Alternative S3 Capping of Soils	Alternative S4 Option A Treatment Using On-Site Incineration	Alternative S4 Option B Treatment Using Off-Site Incineration	Alternative S4 Option C Treatment Using Thermal Desorption	Alternative S5 Option A Treatment Using Chemical Oxidation	Alternative S5 Option B Treatment Using Solvent Extraction	Alternative S6 Off-Site Disposal or Reuse
Reduction of Toxicity, Mobility, and Volume of Contaminants Through Treatment									
Treatment Process Used and Materials Treated	Not applicable	Not applicable	Not applicable	Incineration will remove contaminants of concern by thermal destruction	Incineration will permanently remove contaminants concern by thermal destruction	Thermal permanently permanently remove containments from site soil to be treated or destroyed separately	Chemical Oxidation desorption will destroy soil contaminants	Solvent extraction will will permanently contaminants and subsequently treat them	Excavation and permanently remove soil does not treat or destroy contaminants but will limit their mobility	off-site disposal
Amounts of Materials Treated	None	None	None	All soil	All soil	Soil contaminants	Soil contaminants	Soil	contaminants above	None
contaminants of above be Destroyed	contaminants of concern above Contaminated soils	of concern background levels will		concern above background levels	concern above background levels	background levels will be destroyed	background levels will be destroyed	extracted from soil and treated	will not be treated but will be contained	
Degree of Expected Reduction in Toxicity,Mobility, and Volume	None	None	None	Toxicity, mobility, and volume of containments will be virtually	Toxicity, mobility, and volume of contaminants will be virtually eliminated	Toxicity, mobility, and volume of containments will be significantly reduced	Toxicity, mobility, and volume of contaminants will be significantly reduced	Toxicity,mobility, and volume of contaminants will be significantly reduced through removal of contaminants from site soil	None	
Degree of Irreversibility	Not applicable	Not applicable	Completely reversible	Irreversible	Irreversible	Irreversible	Irreversible	Irreversible	Irreversible	
Type and Quality of Residuals Remaining	All soil contaminants will remain	All soil contaminants will remain	All soil contaminants will remain	No residual contamination above background or risk based levels expected to remain	No residual contamination above background or risk based levels expected to remain	No residual contamination above background or risk based levels expected to remain	No residual contamination expected to remain	No residual contamination expected to remain	No residual contamination expected to remain	
Short-Term Effectiveness										
Protection of Community During Implementation	Not applicable	Institutional controls would restrict direct contact with soils	Erosion and sedimentation as well as dust controls would be implemented during paving operations	Erosion and sedimentation as well as dust controls would be implemented during excavation. Heavy truck traffic would result	Erosion and sedimentation as well as dust controls would be implemented during excavation Heavy truck traffic would result	Erosion and sedimentation as well as dust controls would be implemented during excavation	Erosion and sedimentation as well as dust controls would be implemented during excavation	Erosion and sedimentation as well as well as dust controls would be implemented during excavation	Erosion and sedimentation as well as dust controls would be implemented during excavation Heavy truck traffic would result	

Criteria	Alternative S1 No Action	Alternative S2 Institutional Controls	Alternative S3 Capping of Soils	Alternative S4 Option A Treatment Using On-Site Incineration	Alternative S4 Option B Treatment Using Off-Site Incineration	Alternative S4 Option C Treatment Using Thermal Desorption	Alternative S5 Option A Treatment Using Chemical Oxidation	Alternative S5 Option B Treatment Using Solvent Extraction	Alternative S6 Off-Site Disposal or Reuse

Reduction of Toxicity, Mobility, and Volume of Contaminants Through Treatment

Treatment Process Used and Materials Treated	Not applicable	Not applicable	Not applicable	Incineration will permanently remove contaminants of concern by thermal destruction	Incineration will permanently remove contaminants of concern by thermal destruction	Thermal desorption will permanently remove contaminants from site soil to be treated or destroyed separately	Chemical oxidation will permanently destroy soil contaminants	Solvent extraction will permanently remove soil contaminants and subsequently treat them	Excavation and off-site disposal does not treat or destroy contaminants but will limit their mobility
Amount of Hazardous Materials Treated or Destroyed	None	None	None	All soil contaminants of concern above background levels will be destroyed	All soil contaminants of concern above background levels will be destroyed	Soil contaminants of concern above background levels will be removed	Soil contaminants of concern above background levels will be destroyed	Soil contaminants above background levels will be extracted from soil and treated	None Contaminated soils will not be treated but will be contained
Degree of Expected Reduction in Toxicity, Mobility, and Volume	None	None	None	Toxicity, mobility, and volume of contaminants will be virtually eliminated	Toxicity, mobility, and volume of contaminants will be virtually eliminated	Toxicity, mobility, and volume of contaminants will be virtually eliminated	Toxicity, mobility, and volume of contaminants will be significantly reduced	Toxicity, mobility, and volume of contaminants will be significantly reduced through removal of contaminants from site soil	None
Degree of Irreversibility	Not applicable	Not applicable	Completely reversible	Irreversible	Irreversible	Irreversible	Irreversible	Irreversible	Irreversible
Type and Quantity of Residuals Remaining	All soil contaminants will remain	All soil contaminants will remain	All soil contaminants will remain	No residual contamination above background or risk based levels expected to remain	No residual contamination above background or risk-based levels expected to remain	No residual contamination above background or risk-based levels expected to remain	No residual contamination expected to remain	No residual contamination expected to remain	No residual contamination expected to remain
Short-Term Effectiveness									
Protection of Community During Implementation	Not applicable	Institutional controls would restrict direct contact with soils	Erosion and sedimentation as well as dust controls would be implemented during paving operations	Erosion and sedimentation as well as dust controls would be implemented during excavation Heavy truck traffic would result	Erosion and sedimentation as well as dust controls would be implemented during excavation Heavy truck traffic would result	Erosion and sedimentation as well as dust controls would be implemented during excavation	Erosion and sedimentation as well as dust controls would be implemented during excavation	Erosion and sedimentation as well as dust controls would be implemented during excavation	Erosion and sedimentation as well as dust controls would be implemented during excavation Heavy truck traffic would result
Criteria	Alternative S1 No Action	Alternative S2 Institutional Controls	Alternative S3 Capping of Soils	Alternative S4 Option A Treatment Using On-Site Incineration	Alternative S4 Option B Treatment Using Off-Site Incineration	Alternative S4 Option C Treatment Using Thermal Desorption	Alternative S5 Option A Treatment Using Chemical Oxidation	Alternative S5 Option B Treatment Using Solvent Extraction	Alternative S6 Off-Site Disposal or Reuse
Protection of Workers	Not applicable	Not applicable	Workers would be adequately protected during construction	Workers would be adequately protected during soil remediation	Workers would be adequately protected during soil remediation	Workers would be adequately protected during soil remediation	Workers would be adequately protected during soil remediation	Workers would be adequately protected during soil remediation	Workers would be adequately protected during soil remediation
Time to achieve protection	18 months	19 months	32 months	36 months	27 months	36 months	24 months	2 months for this action	
Implementability									
Ability to Construct and Operate the Technology	Not applicable	Not applicable	Asphalt capping uses ordinary paving techniques	Mobile Incinerators are widely used and easily constructed and operated Test burns are required	Off-site incinerators exist and are easily accessed	Thermal desorption units are commercially available and easily operated Pilot tests are required	Mobile chemical oxidation units can be easily installed and operated	Solvent extraction units are commercially available and easily installed and operated	Excavation and off-site disposal can be easily implemented through regular excavation activities

Ease of Site Preparation	Not applicable	Not applicable	Easily performed	No site preparation needed	No site preparation needed	No site preparation needed	No site preparation needed	No site preparation needed	No site preparation needed
Ease of Undertaking Additional Remedial Actions	Not applicable	Easily Undertaken	Will not interfere with any additional remedial actions	Will not interfere with any additional remedial actions	Will not interfere with any additional remedial actions	Will not interfere with any additional remedial actions	Will not interfere with any additional remedial actions	Will not interfere with any additional remedial actions	Will not interfere with any additional remedial actions
Ability to Monitor Effectiveness	Not applicable	Access and deed restrictions easily monitored	Cap will be periodically inspected for signs of deterioration and damage	Treated soils and site excavations will be tested to ensure that treatment standards are met	Treated soils and site excavations will be tested to ensure that treatment standards are met	Treated soils and site excavations will be tested to ensure that treatment standards are met	Treated soils and site excavations will be tested to ensure that treatment standards are met	Treated soils and site excavations will be tested to ensure that treatment standards are met	Confirmatory sampling will ensure complete removal of contaminated soil
Ability to Obtain Approval from Other Agencies	Not applicable	Deed restrictions should not be difficult to obtain	Approval not needed	Test burns required to ensure proper operating conditions	Approval not needed	Pilot tests required to ensure proper operating conditions	Approval not needed	Approval to operate an on-site chemical oxidation unit should not be difficult to obtain	Approval by a landfill may be difficult to obtain
Availability of Materials	Not applicable	Materials for security measures are readily available	Materials are readily available	Materials are readily available	Materials are readily available	Materials are readily available	Materials are readily available	Materials are readily available	Materials are readily available
Time to achieve protection	18 months	19 months	32 months	36 months	27 months	36 months	24 months	30 months	2 months for this action
Criteria	Alternative S1 No Action	Alternative S2 Institutional Controls	Alternative S3 Capping of Soils	Alternative S4 Option A Treatment Using On-Site Incineration	Alternative S4 Option B Treatment Using Off-Site Incineration	Alternative S4 Option C Treatment Using Thermal Desorption	Alternative S5 Option A Treatment Using Chemical Oxidation	Alternative S5 Option B Treatment Using Solvent Extraction	Alternative S6 Off-Site Disposal or Reuse
Implementability continued									
Availability of Unusual or Special Services	Not applicable	Not applicable	Not needed	Readily available	Readily available	Readily available	Readily available	Readily available	Not needed
Modifying Criteria									
Community acceptance	low	low	low	low	low	moderate	high	moderate	moderate
State Acceptance	low	low	low	moderate	moderate	moderate	high	moderate	

Table 7. ARARs for Alternative S6: Soil Excavation and Off-Site Disposal or Reuse

Media	Requirement	Requirement Synopsis	Action To Be Taken To Attain Requirements	Status
		CHEMICAL-SPECIFIC		
Soil	FEDERAL-EPA Risk Reference Doses (RfDs)	RfDs are dose levels developed based on the noncarcinogenic effects and are used to develop Hazard Indices. A Hazard Index of less than or equal to 1 is considered acceptable.	EPA RfDs have been used to characterize risks caused by exposure to contaminants in soil. Excavation and off-site disposal or reuse of contaminated soils will minimize risks.	TBC
Soil	FEDERAL-EPA Carcinogen Assessment Group Potency Factors	Potency Factors are developed by EPA from Health Effects Assessments or evaluation by the Carcinogenic Assessment Group and are used to develop excess cancer risks. A range of 10-4 to 10-6 is considered acceptable.	EPA Carcinogenic Potency Factors have been used to compute the individual incremental cancer risk resulting from exposure to site contamination in soil. Excavation and off-site disposal or reuse of contaminated soils will minimize risks.	TBC
		LOCATION-SPECIFIC		
Soil	FEDERAL-16 USC 470 et. seq., National Historic Preservation Act and 7 CFR Part 650	Requires that action be taken to preserve historic properties. Planning action is required to minimize the harm to national historic landmarks.	MTL is a historic district and the Commander's Quarters is on the National Register of Historic Places. Army will consult with State Historic Office to ensure that actions that may cause structural damage to any building will be minimized.	Applicable
Soil	FEDERAL-16 USC 469A-1, Archaeological and Historic Preservation Act	Provides for the preservation of historical and archaeological data that might be lost from alteration of the terrain. The Act require data recovery and preservation activities be conducted if any project may cause irreparable loss or destruction to scientific, prehistoric, or archaeological data.	Actions involving intrusive work (e.g., excavation and construction) will require involvement of archaeologists and regulatory agencies if artifacts are found. Two known historic sites and one suspected prehistoric site are present at MTL.	Applicable

Table 7. Continued

Media	Requirement	Requirement Synopsis	Action To Be Taken To Attain Requirements	Status
Soil	STATE-Massachusetts Historical Commission Regulations (950 CMR 70-71)	Establishes regulations to minimize or mitigate adverse effects to properties listed in the State Register of Historic Places. MTL is listed in the State Register. The regulations contain standards that protect the public's interest in preserving historic and archaeological properties as early as possible in the planning process or any project.	Requirements include notification to the Massachusetts Historical Commission (MHC). MHC will make a determination as to whether the actions planned will have an adverse impact. If so, the MHC and party responsible for the action will consult to determine ways to minimize adverse impacts.	Applicable
		ACTION-SPECIFIC		
Soil, Hazardous Waste	FEDERAL-"Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," EPA Publication SW-846	This guidance document sets forth the methods for conducting TCLP testing.	The guidance will be used when testing soils at the site to determine whether they constitute hazardous waste.	TBC
Soil, Hazardous Waste	STATE-310 CMR 30.640, Waste Piles	Establishes requirements for waste piles containing hazardous waste.	Any piles of hazardous excavated soil will comply with these requirements.	Relevant and Appropriate, Applicable for any soil classified as hazardous waste.

Table 7. Continued

Media	Requirement	Requirement Synopsis	Action To Be Taken To Attain Requirements	Status
Air	FEDERAL-CAA 40 CFR Part 61, National Emission Standards for Hazardous Air Pollutants (NESHAPs)	Sets air emission standards for 189 designated hazardous air pollutants (HAPs) from designated sources activities.	Sampling of MTL has indicated the presence of several HAPs in soils. Place site remediation is a designated source category (but is this case is unlikely to be a major source), NESHAPS are relevant and appropriate and all remedial activities will be designed to meet Maximums Achievable Control Technology (MACT).	Relevant and Appropriate
Air	STATE-310 CMR 7, Air Pollution Control Regulations	Establishes requirements for attaining ambient air quality standards by setting emission limitations, design specifications, and permitting. Watertown is in an attainment area for lead, nitrous oxide, sulfur dioxide, and particulate matter, and is in a nonattainment area for ozone and carbon monoxide. Pertinent sections of the regulation include Visible Emissions (310 CMR 7.06); Dust, Odor, Construction, and Demolition (310 CMR 7.09); Noise (310 CMR 7.10); and Volatile Organic Compounds (310 CMR 7.18).	Remedial activities will be conducted so as to incorporate reasonably available control technology (RACT for emissions of lead, nitrous oxide, sulfur dioxide, and particulate matter, and to achieve lowest achievable emission rate (LAER) for VOCs and carbon monoxide.	Applicable (310 CMR 7.06, 7.09,and 7.10 Relevant and Appropriate (310 CMR 7.18)
Air	STATE-DAQC Policy 90-601, Allowable Sound Emissions	This policy combines sound emissions to be in violation of 310 CMR 7.10 if the source increases the broadband sound level by more than 10 dB(A) above ambient, or produces a "pure tone" condition as measured at both the property line and at the nearest inhabited residence.	Remedial activities will be conducted so as not to exceed the policy's allowable sound levels.	TBC
Sell, Hazardous Waste Waste	State-310 CMR 38.68 , Use and Management of Containers	Establishes requirements for the management of containers, such as drums, that would hold field-generated hazardous waste.	Any hazardous waste containers would comply with these requirements.	Relevant and Appropriate, Applicable for any classified as hazardous waste.

Table 8. Estimated Capital Costs for Accelerated Alternative: Soil Excavation and Off-Site Disposal or Reuse Site Area I

Item	Description	Quantity	Unit Cost ($)	Total Cost ($)
1	Excavate, transport, and stage contaminated material	900yd3	13.60/yd3	12,000
2	Transport and dispose of excavated material as contaminated waste at a landfill (without stabilization):			
	• Hazardous waste (450 yd3 @ 1.4 tons/yd3 = 700 tons)	700 tons	246/ton	155,000
	• Nonhazardous waste (450 yd3 @ 1.4 tons/yd3 = 1,400 tons)	1,400 tons	65/ton	41,000
3	Backfill excavated areas:			
	• Import and place clean soil at excavated areas, grade and contour	900yd3	16.10/yd3	15,000
	• Import and place topsoil, 6 inches thick	lump sum	6,000	6,000
	• Seeding and mulching, revegetation			
4	Other restoration issues and landscaping	lump sum	6,000	6,000
5	Construction air monitoring	lump sum	12,000	12,000
6	Health and safety (Plans & Specs)	31 days	750/day	23,000
7	Excavation stockpile sampling and analysis	6 samples	2,000 /sample	12,000
8	Excavation delineation sampling	6 samples	2,000 /sample	12,000
9	Erosion and sediment controls	lump sum	1,000	1,000
10	Mobilization/demobilization	lump sum	10,000	10,000
11	Subtotal			305,000
12	Engineering, procurement, administrative, and legal costs (20%)			63,000
13	Subtotal			368,000
14	Government construction management (8%)			38,000
15	Contingency (50% of 2,4,5,7,8)			117,000
17	Total (Rounded)			523,000

Appendix C. State Concurrence

COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS
DEPARTMENT OF ENVIRONMENTAL PROTECTION
ONE WINTER STREET, BOSTON MA 02108 (617) 292-5500

WILLIAM F. WELD
Governor

TRUDY COXE
Secretary

TRUDY COXE

ARGEO PAUL CELLUCCI
Lt. Governor

DAVID B. STRUHS
Commissioner

June 11, 1996

Linda Murphy
Director, Waste Management Division
U.S. Environmental Protection Agency
Region I, JFK Building
Boston, MA 02203-2211

RE: Army Materials Technology Laboratory
Area I and M Operable Unit
Watertown, MA

Dear Ms. Murphy:

The Massachusetts Department of Environmental Protection (Department)has reviewed the Draft June 1, 1996 Record of Decision (ROD) regarding the Building 131 (Area I) Operable Unit (B131 OU). The Department has reviewed the Army's preferred accelerated remedial action for consistency with Massachusetts General Law Chapter 21E and the Massachusetts Contingency Plan. Based upon this review, the Department concurs with the selected remedial action. The preferred accelerated remedial action will be protective of human health, welfare, and the environment for the B131 OU areas. Additionally, the preferred accelerated remedial action will meet state ARARs and be cost effective.

The preferred accelerated remedial action will:

1.) Excavate soils in Areas I.
2.) Determine soil contaminants characteristics for disposal options.
3.) Transport soils off-site for recycling, reuse, or disposal based on hazardous characterization.
4.) Back fill contaminated areas with clean soil.

The Town of Watertown's request for transfer of Building 131 and the Army's desire to expedite property transfer necessitates the execution of the accelerated remedial action. The removal of contaminated soils from Area I for off-site recycling, reuse, or disposal, based on hazardous characterization and confirmatory sampling, will be to the more stringent residential cleanup level. This is consistent with the local reuse plans for this area of the site and will not require the implementation of institution controls the Building 131 area. This area will be available for unrestricted future use.

The Department looks forward to working with EPA and the Army in this common endeavor and we are pleased to assist in the transfer of Army property in a manner that is protective of human health, welfare, and the environment. If you have any question please feel free to contact me at (617) 292-5648.

Very truly yours,

<IMG SRC 0196128E>

James C. Colman
Assistant Commissioner

cc: Mr. Steven Ward, Watertown Board of Health
Mr. John Airasian, Chairman Watertown Reuse Committee
Honorable Warren Tolman, State Senator
Honorable Rachel Kaprielian, State Representative
Mr. Matt O'Neill, Office of the Honorable Joseph P. Kennedy II
Ms. Megan Cassidy, Environmental Protection Agency
Mr. Robert Chase, AMSRL-OP-RK-WT
Mr. Steve Johnson, DEP BWSC - NERO

Appendix D. Administrative Record

US. Army Materials Technology Lab
Watertown, Ma
Administrative Record

DOC. #	DESCRIPTION	AUTHOR	DATE
	FACTUAL INFORMATION		
1.	Preliminary Assessment Site Inspection	E G&G Idaho Inc	3/88
2.	Technical Plans for USAMTL Remedial Investigation and Feasibility Study	E G&G Idaho Inc	5/88
3.	USAMTL Remedial Investigation (Volume I and III)	E G&G Idaho Inc	9/89
4.	Final Phase II Remedial Investigation Report (Volume I through III)	Roy F. Weston	12/93
5.	Final Phase II Remedial Investigation Report (Volume I through V)	Roy F. Weston	5/94
6.	Baseline Risk Assessment Environmental Evaluation	Roy F. Weston	12/93
7.	Final Terrestrial Risk Assessment	Roy F. Weston	8/95
8.	Final Feasibility Study Report (Outdoor) (Volume I and II)	Roy F. Weston	1/96
9.	Draft Addendum to Human Health Evaluation	Roy F. Weston	2/96
10.	Feasibility Study for Base Closure RI/FS Responsiveness Summary	Roy F. Weston	11/95
11.	Feasibility Study for Base Closure RI/FS Responsiveness Summary	Roy F. Weston	1/96
12.	Final Proposed Plan	Roy F. Weston	4/96
13.	Draft Final Proposed Plan for Base Closure Responsiveness Summary	Roy F. Weston	4/96
14.	USAMTL Remedial Investigation Responsiveness Summary	Roy F. Weston	4/93
15.	Phase II Remedial Investigation Comments	NONE	MISC.
16.	Terrestrial Ecological Risk Assessment Comments	NONE	MISC.
17.	Terrestrial Ecological Risk Assessment Response to Comments	Roy F. Weston	6/95
18.	Feasibility Study Comments	NONE	MISC.
19.	Proposed Plan Comments	NONE	MISC.
20.	Community Comments on Residential vs. Commercial Cleanup Standards	NONE	MISC.
21.	Phase I Remedial Investigation Report	Roy F. Weston	4/91
22.	Community Environmental Response Facilitation Act Report	Environ. Res. Mgt.	4/94
23.	Final Hazard Ranking Package for AMTL	Halliburton Nus	4/93
24.	Federal Facilities Agreement	EPA/Army	5/95
25.	Phase 1 RI Comments	NONE	MISC.
26.	Army Regulation 200-1, Environment Protection and Enhancement, and 200-2, Environmental Effects of Army Actions	Army Army	5/90, & 12/88

DOC. #	DESCRIPTION	AUTHOR	DATE
	PUBLIC PARTICIPATION		
27.	BRAC Cleanup Plan Guidebook	Dept. of Defense	10/93
28.	Base Realignment and Closure Plan Version I	Earthtech	3/94
29.	Base Realignment and Closure Plan Version II	Earthtech	3/95
30.	Comments on BCP	NONE	MISC.
31.	Media Coverage	NONE	MISC.
32.	Site Tour Handouts	NONE	6/94
33.	Site Tour Handouts	NONE	10/94
34.	Site Tour Handouts	NONE	6/95
35.	Site Tour/Information Session Handouts	Army	1/96
36.	Information Session- Outdoor Remediation	Army	4/96
37.	Community Relations Mailing List	Army	MISC.
38.	Restoration Advisory Board Meeting Dates	Army	MISC.
39.	Project Team Meeting Dates	Army	MISC.
40.	Public Involvement and Response Plan	Roy F. Weston	2/92
41.	Community Relations Plan	Roy F. Weston	5/95
42.	LTC Blose's Brief to Reuse Committee	Army	4/96
43.	Public Hearing Proposed Plan Transcript and Comments	Army	5/96
	OTHER INFORMATION		
44.	Trustee Notification Letters	Army	7/94
45.	Watertown Arsenal Reuse and Feasibility Study (Town Reuse Plan)	Goody-Clancy	11/93
46.	EIS for Disposal and Reuse	Jaycor	9/95
47	Public Health Assessment for MTL	ATSDR	2/96
48.	Health Consultation for MTL	ATSDR	3/96
49.	Guidance List	None	N/A
50.	OSWER Directive 9355.7-04 Land Use in the CERCLA Remedy Process	EPA	5/95
51.	Technical Memorandum for Area I	Army	6/96